42. Notes on the Undulatory Deformation of the Earth's Crust.

By Chûji TSUBOI,

Earthquake Research Institute.

(Read May 15, 1934.—Received Sept. 19, 1934.)

In a previous paper,[1] the writer discussed the changes in the heights of bench-marks that occurred during the last 35 years along the line of levels, exceeding a distance of 1000 km., between Hamada and Sibata on the Japan Sea coast of Honsyû and showed that the deformation of the earth's crust in that region was undulatory, consisting of alternative upheavals and depressions with a mean wave-length of 80 km. The question as to what is the areal distribution of these crustal deformations in this region may be answered in at least two ways. We may assume the existence of series of parallel wave-like deformations, or we may assume a mosaic distribution of areas of upheaval and depression. Since the resulting changes in the heights of bench-marks on one and the same line of levels, remain the same whichever assumption is made, there is no choice between the two alternatives.

Recently N. Miyabe[2] who made a similar study of the changes in height on two lines of levels, the one along the Pacific coast and the other in the central zone of Japan, reached conclusions similar as mine.

The question now naturally arises how are the changes in height along the numerous lines of levels that run across Honsyû. There are four such lines the changes in height on which have been measured.

> They are 1) Itoigawa–Issinden,
> 2) Nagaoka–Okitu,
> 3) Nagaoka–Ooike,
> 4) Wazima–Kusimoto,

all linking the line of levels along the Japan Sea coast with that along the Pacific coast. The changes in the heights of bench-marks on these lines are graphically shown in Figs. 1~4. They are in general undula-

---

1) C. TSUBOI, *Bull. Earthq. Res. Inst.*, **12** (1934), 174.
2) N. MIYABE, *ibid.*, **12** (1934), 460.

tory, although the undulation is less regular than that described in
the previous paper. The wave-length of the undulation is roughly 100
km. which is a little longer than that shown in the previous paper.

While too much trust cannot be placed on these numerical values,
it is now certain that the undulatory deformation can be found not only
along the lines of level that run parallel to the trend of Honsyû but also
along those that run across the same island. It seems therefore that, of
the two alternatives in the matter of the areal distribution of crustal
deformations proposed in the previous paper, the one that assumes
alternative distribution of areas of upheaval and depression in an
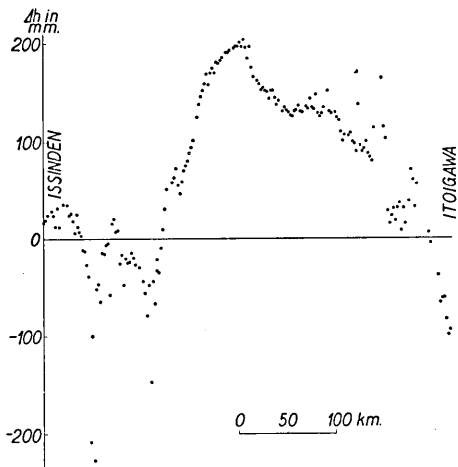irregular checkered pattern is much the more probable than the other.

Fig. 1. Changes in heights of bench-marks
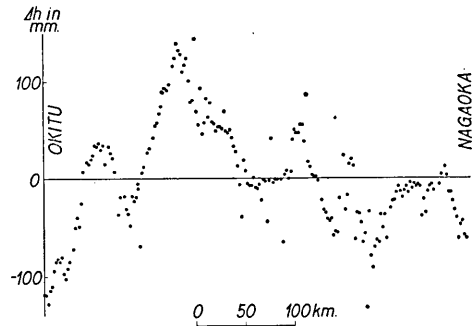between Itoigawa and Issinden.

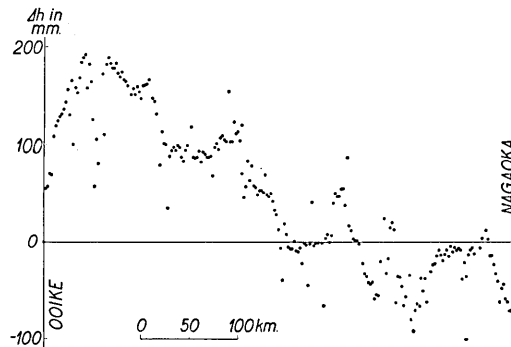Fig. 2. Changes in heights of bench-marks
between Nagaoka and Okitu.

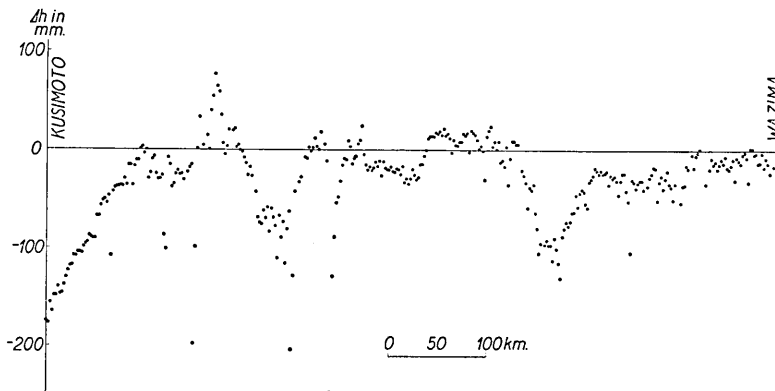Fig. 3. Changes in heights of bench-marks
between Nagaoka and Ooike.

Fig. 4. Changes in heights of bench-marks
between Wazima and Kusimoto.

42.　地　殻　の　波　狀　的　變　動　に　就　い　て

地 震 研 究 所　坪　　井　　忠　　二

　著者はかつて濱田から新發田に到る水準線路の變形を論じて約 80 km. の波長を有する隆起沈降の波の様なものがある事を指摘した．しかしこの變形が二次元的には如何なるものであるかは解らなかつた．其後宮部理學士も本州の中央及び東海道岸の水準線路についても同様の結論を得た．それで更に本州を横断する 4 本の線路の變動を調べてみた處がやはり同じ様な波形を示す事が解つた．それで此の變動は二次元的には隆起區域と沈降區域とが不規則な市松模様に並んでゐると考へるのが至當である様に思はれるのである．